COMPRESSION PROCESS FOR STORING TREND AND CHARACTERISTICS OF INFORMATION IN A COMPUTER, DUMMY PICTURE COMPRESSION SIGNAL, DATA COMPRESSION MEANS, METHOD FOR COMPRESSING DATA, AND METHOD FOR REPRODUCING DATA

The entire disclosure of Japanese Patent Application No. 2000-134118, filed on May 8, 2000, including its specification, claims, drawings and summary is incorporated herein by reference in its entirety.

Background of the Invention

1. Field of the Invention

The present invention relates to a process and an apparatus for transmitting data for a purpose of notifying a trend and a characteristic amount concerning information about the data when the data is transmitted to a remote place.

2. Description of the Related Art

As shown in Fig. 2, in the case of transmitting data that is stored in a transmitting information device 10 such as a personal computer and a workstation to an information receiving device 20 which is located at a remote place, it has been known to utilize a network system and a hand-carry medium such as a floppy disc. In such a case, the data is usually compressed and transmitted depending on a communication band of the network and a capacity of the hand-carry medium.

In a conventional art, a compression method has been utilized if the compression can recover compressed data reliably.

However, in the case of transmitting data of which a regularity degree is relatively low such as Fast Fourier Transform (FFT) analysis

data, the above-described method is improper since a compression ratio and a transmitting efficiency are relatively low.

Summary of the Invention

To resolve the above-described problem, a compression means according to the present invention converts a predetermined number of data stored in an information transmitting device into a dummy picture, compresses the dummy picture in accordance with a picture compression treatment, and transmits the compressed dummy picture to an information receiving device in the case where data includes an important characteristic curve. The compression means receives the compressed dummy picture, reproduces the dummy data and divides the reproduced dummy picture into the predetermined number of data sections so as to recover the original data at an information receiving device.

Brief Description of the Drawings

Fig. 1 shows the first embodiment according to the present invention.

Fig. 2 is a drawing for explaining an idea of the present invention for transmitting data.

Fig. 3 shows one example of FFT analysis data.

Fig. 4 shows one example of a plurality of the FFT analysis data collected at a predetermined interval.

Fig. 5 is a drawing for explaining dummy-picturing data corresponding to the data as shown in Fig. 4.

Detailed Description of the Invention

As shown in Fig. 2, the present invention is suitable for the case of transmitting data that is stored in an information transmitting device 10 to an information receiving device 20 through a network system or a hand-carry medium such as a floppy disc.

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In the case of transmitting data including an important characteristic curve such as FFT analysis data to a remote site, it is more important to notify the characteristics and trend of the original data than to reproduce the data faithfully. Thus, the present invention combines a technique of dummy picturing and a technique of compressing a picture so as to transmit the characteristics and the trend of the original data more efficiently.

As shown in Fig. 3, the FFT analysis data, of which an amount corresponds to a data array such as frequency, is one-dimensional data. A plurality of these FFT data are collected for each predetermined interval so as to form a two dimensional data group including a time elapse axis, as shown in Fig. 4.

An amount of the data group for each point is indicated as brightness so as to form a dummy picture data, in which, as shown in Fig. 5, a X-axis is the data array and a Y-axis is time elapse.

That is, the higher the brightness level becomes, the higher the amount of the data becomes in the dummy picture data.

The dummy picture data is highly compressed by picture compression means.

In general, regarding a normal picture compression method such as JPEG, characteristics of compressed picture data are preserved although a slight brightness difference between each point is ignored.

By ignoring such a difference, the characteristics of the data can be faithfully reproduced at a high level and a high compression ratio can be obtained even though the reproduced picture is not completely equal to the original data.

In the present invention, dummy pictured data is highly compressed by the above-described picture compression method and is

reproduced to the original two dimension data as shown in Fig. 4.

As described above, the technique of the dummy picturing and the technique of the picture compression are combined in the present invention so that the characteristic amount and the trend of the data can be faithfully preserved at a certain level and a high compression can be accomplished.

The more the data is compressed, the more information that is transmitted per one unit time is increased in a network communication. Upon comparison with the conventional art and the present invention, if an information amount is the same, the transmitting speed of the present invention is faster than the transmitting speed of the conventional art.

In the case of a hand-carry medium as shown in Fig. 2, more information can be recorded in one medium.

For example, although it depends on the content of data, an original data amount (100%) can only be compressed to an amount of 10% to 20% with respect to the original data amount by compressing dummy picturing data in accordance with the present invention. On the other hand, in a conventional compression method for compressing FFT analysis, an original data amount can be compressed to an amount of 80% to 90%.

First Embodiment

A first embodiment of the present invention is shown in Fig. 1.

The first embodiment is suitable for remote supervision with respect to a local plant 100.

At the local plant 100, a gas turbine 101 is controlled by a control device 102, and burning vibration, pressure vibration, axial vibration, sound vibration and so on caused by the gas turbine 101 are detected.

It is necessary to compress and transmit the detected data so that the detected data can be analyzed by a monitor site 200 which is located

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at a remote place.

The data that is detected by the control device 102 at the local plant 100 is FFT analyzed (S1) so as to form one dimensional data corresponding to the data array.

5   A plurality of FFT analyzed data are collected for each predetermined interval so as to form a two dimensional data group including a time elapse axis. An amount of the data group at each point is indicated as brightness so as to form dummy picture data in which a X-axis is a data array and a Y-axis is a time elapse (S2).

10   Further, the dummy picture data is picture-compressed by a picture compression method so as to transmit the compressed dummy picture data from transmitting means 103 at the local plant 100 to transmitting means 201 at a monitoring site 200 (S3).

At the monitoring site 200, the transmitted compressed data is
15   reforested so as to reproduce to the dummy picture data (T1). Further, the dummy picture data is recovered to the original FFT analysis data (T2) and the recovered data is displayed on a monitor 202.

In the present invention, dummy picture data can be picture-compressed at a high compression ratio and transmitted from the
20   local plant 100 to the monitoring site 200 so that characteristics and trends of various information about the gas turbine 101 which is located at the local plant 100 can be collectedly acknowledged at the monitoring site 200 which is located at a remote site and a transmitting time can be shortened.

25   If there is a doubt of abnormal condition judging from the result of the analysis, the conventional method such as FFT analysis data may be used to faithfully recover the original data in addition to the dummy picture data.

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Other embodiments

The present invention is suitable for a device for always monitoring vibration conditions of a machine at a remote place (for example, an observation camera).

5   Accordingly, in order to obtain a characteristic amount of a picture that is photographed by an observation camera, an FFT analysis device is provided. According to the result of continuous analysis by the FFT analysis device, the monitoring can be accomplished at a remote site.

10   In addition, the FFT analysis is also used for analyzing frequency components which originate from a machine. Such an analysis can be accomplished at a remote site.

As described above with reference to the embodiments of the present invention, in the case of transmitting data including an important characteristic curve to a remote place, a predetermined number of the data are collected at a transmitting site so as to dummy-picture the data. The dummy-pictured data is compressed at a high compression ratio by a picture compression treatment. At a receiving side, the compressed dummy picture data is received and recovered to the dummy picture data. By dividing the received dummy picture data into the predetermined number of sections, the original data can be reproduced. Thus, the data is compressed at a high compression level so that a transmitting efficiency can be improved.

The present invention is, of course, in no way restricted to the specific disclosure of the specification and drawings, but also encompasses any modifications within the scope of the appended claims.

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